FIG. 1

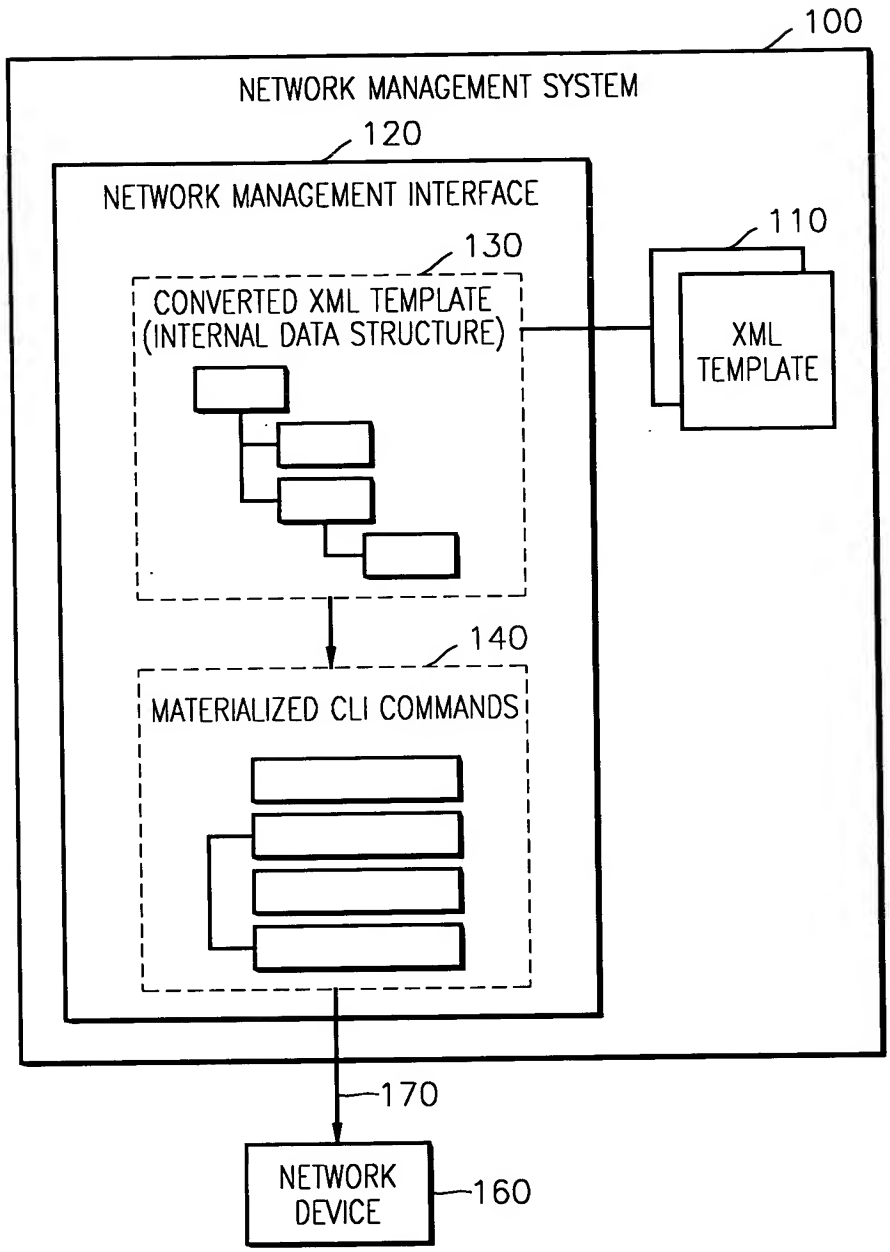

100
NETWORK MANAGEMENT SYSTEM
120
NETWORK MANAGEMENT INTERFACE
130
CONVERTED XML TEMPLATE (INTERNAL DATA STRUCTURE)
110
XML TEMPLATE
140
MATERIALIZED CLI COMMANDS
170
NETWORK DEVICE
160

FIG. 2

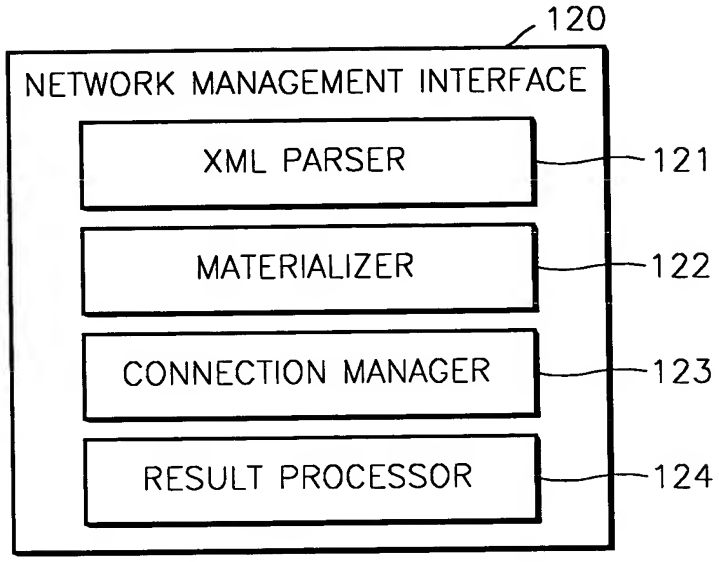


FIG. 3

111

```
<!ELEMENT cli (#PCDATA | (cli)*)>
<!ATTLIST cli
tag                 CDATA                #IMPLIED
prompt1             CDATA                #IMPLIED
prompt2             CDATA                #IMPLIED
command             CDATA                #IMPLIED
errorstr            CDATA                #IMPLIED
always              (true | false)       "false"
ainput              CDATA                #IMPLIED
ainputresponse      CDATA                #IMPLIED>
```

FIG. 4

112

```
(config)# router bgp 55555
(config-router)# address-family ipv4 vrf VRF-SEOUL
(config-router-af)# neighbor 203.255.25.15 remote-as 5555
(config-router-af)# neighbor 203.255.25.15 activate
```

113

```
<cli prompt1="#" command="config terminal" errorstr="^">
  <cli tag="bgp1" prompt1="#"
     command="router bgp $asnum" errorstr="^">
    <cli>
      <cli tag="bgp2" prompt1="#"
           command="address-family ipv4 vrf $vrfname"
           errorstr="^">
        <cli>
          <cli tag="bgp3" prompt1="#"
               command="neighbor $ipn1 remote-as $nasnum"
               errorstr="^">
          </cli>
          <cli tag="bgp4" prompt1="#"
               command="neighbor $ipn2 activate"
               errorstr="^">
          </cli>
        </cli>
        <cli prompt1="#" always="true" command="exit"></cli>
      </cli>
    </cli>
    <cli prompt1="#" always="true" command="exit"></cli>
  </cli>
  <cli prompt1="#" always="true" command="exit"></cli>
</cli>
```

FIG. 5

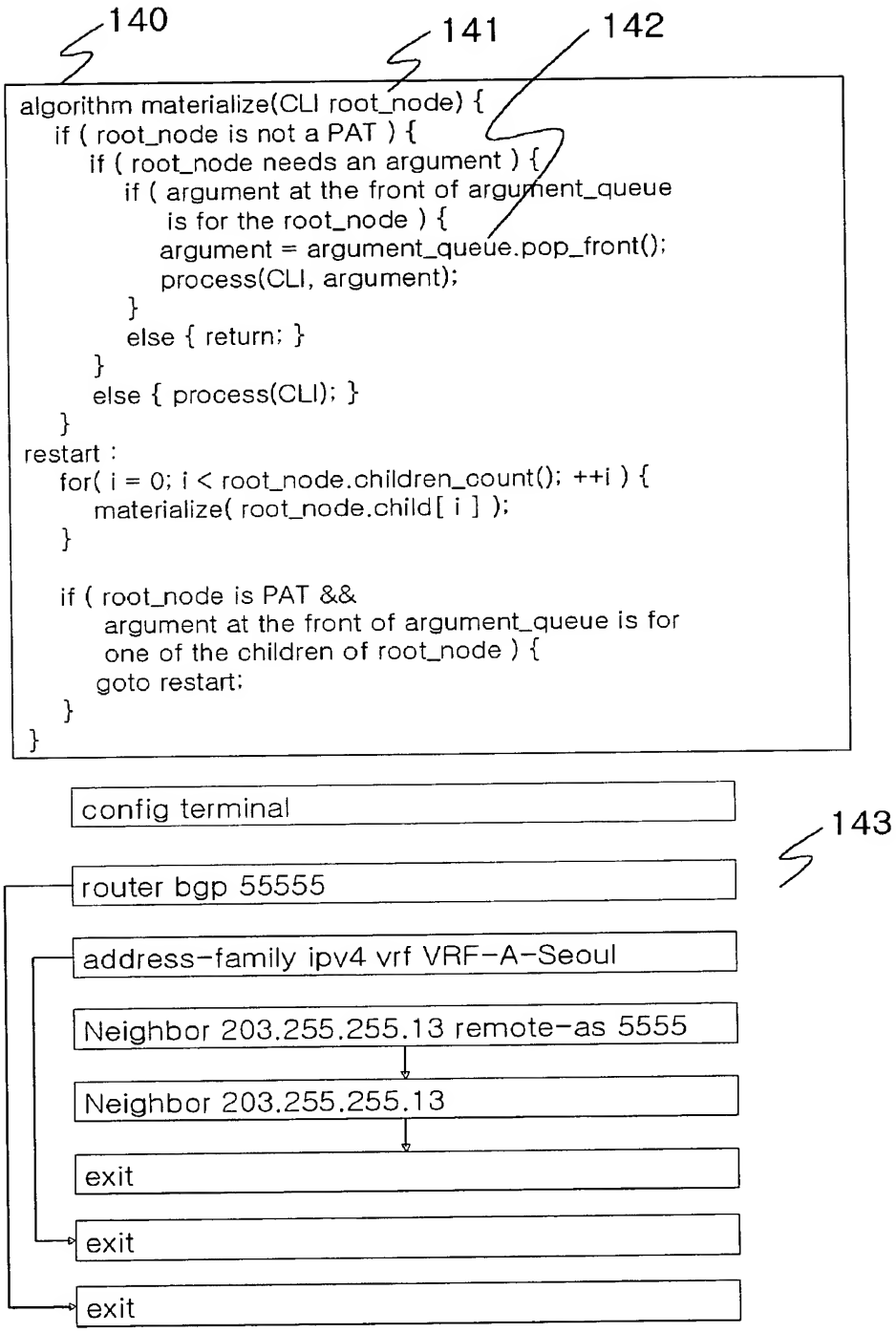

140
141
142
algorithm materialize(CLI root_node) {
if (root_node is not a PAT) {
if (root_node needs an argument) {
if (argument at the front of argument_queue
is for the root_node) {
argument = argument_queue.pop_front();
process(CLI, argument);
}
else { return; }
}
else { process(CLI); }
}
restart :
for(i = 0; i < root_node.children_count(); ++i) {
materialize(root_node.child[i]);
}
if (root_node is PAT &&
argument at the front of argument_queue is for
one of the children of root_node) {
goto restart;
}
}
config terminal
143
router bgp 55555
address-family ipv4 vrf VRF-A-Seoul
Neighbor 203.255.255.13 remote-as 5555
Neighbor 203.255.255.13
exit
exit
exit

FIG. 6

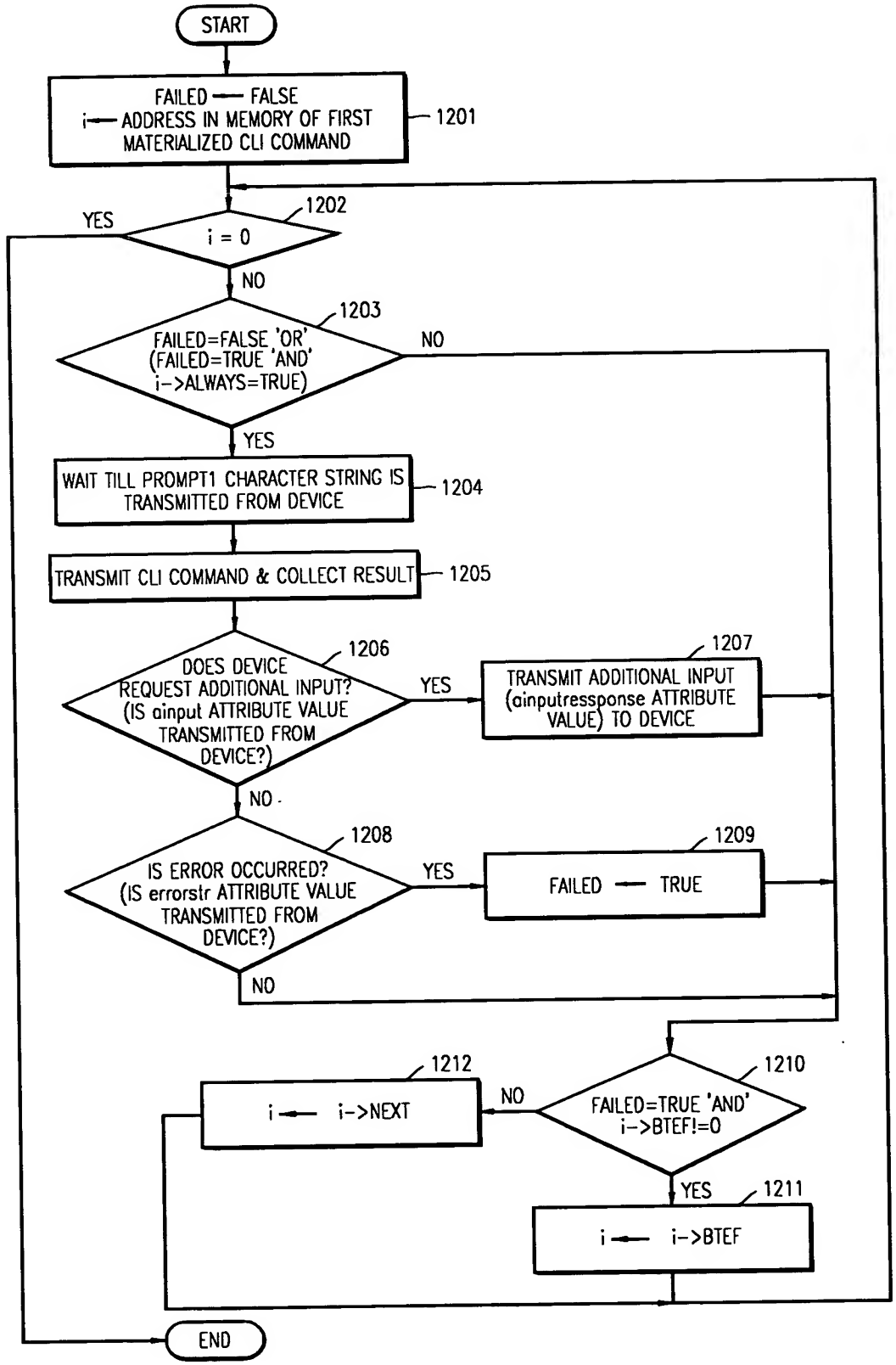
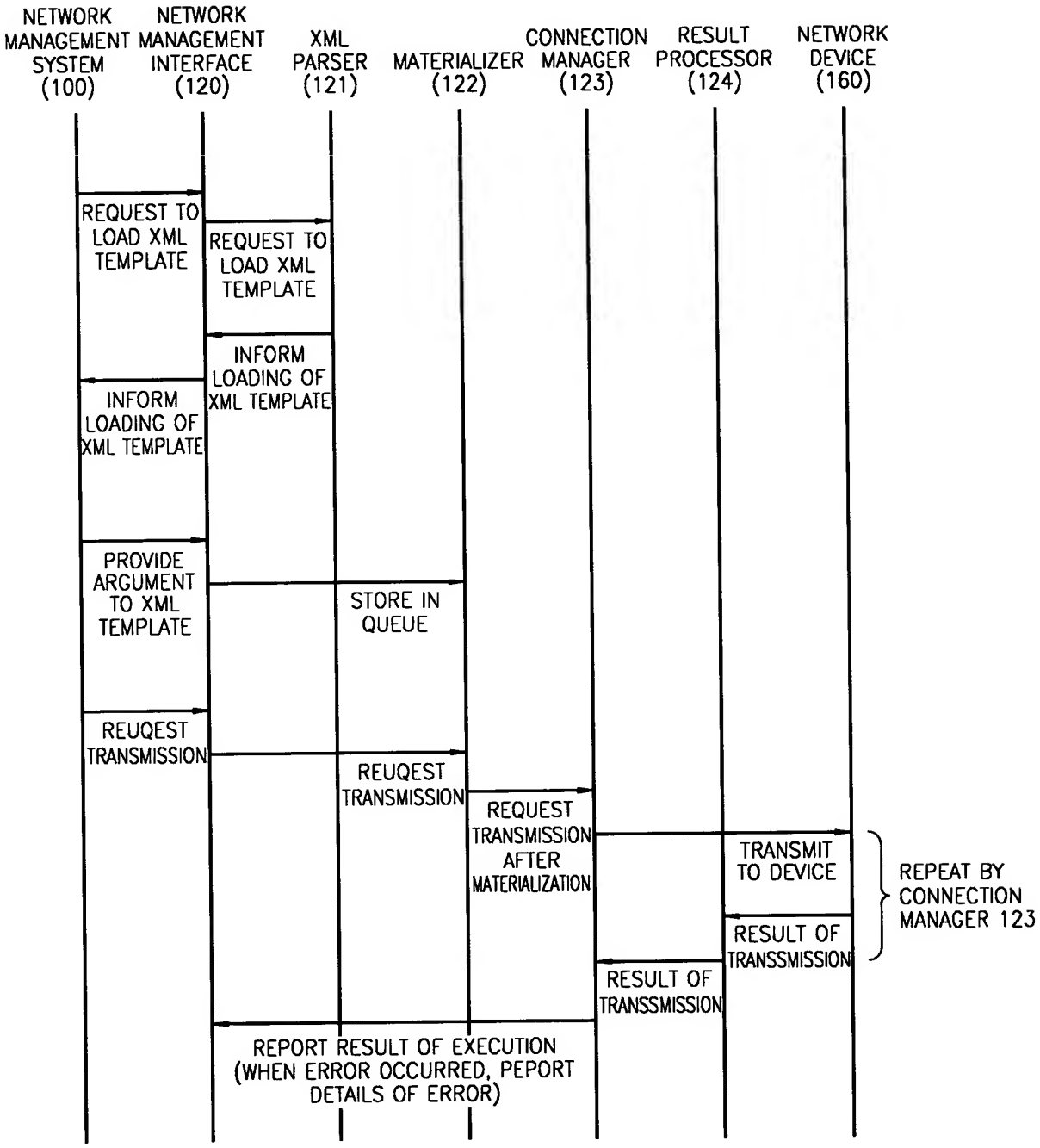

START
FAILED — FALSE
i — ADDRESS IN MEMORY OF FIRST MATERIALIZED CLI COMMAND
1201
1202
i = 0
YES
NO
1203
FAILED=FALSE 'OR' (FAILED=TRUE 'AND' i->ALWAYS=TRUE)
NO
YES
WAIT TILL PROMPT1 CHARACTER STRING IS TRANSMITTED FROM DEVICE
1204
TRANSMIT CLI COMMAND & COLLECT RESULT
1205
1206
DOES DEVICE REQUEST ADDITIONAL INPUT? (IS ainput ATTRIBUTE VALUE TRANSMITTED FROM DEVICE?)
YES
1207
TRANSMIT ADDITIONAL INPUT (ainputressponse ATTRIBUTE VALUE) TO DEVICE
NO
1208
IS ERROR OCCURRED? (IS errorstr ATTRIBUTE VALUE TRANSMITTED FROM DEVICE?)
YES
1209
FAILED — TRUE
NO
1212
i — i->NEXT
NO
1210
FAILED=TRUE 'AND' i->BTEF!=0
YES
1211
i — i->BTEF
END

FIG. 7


NETWORK MANAGEMENT SYSTEM (100)
NETWORK MANAGEMENT INTERFACE (120)
XML PARSER (121)
MATERIALIZER (122)
CONNECTION MANAGER (123)
RESULT PROCESSOR (124)
NETWORK DEVICE (160)
REQUEST TO LOAD XML TEMPLATE
REQUEST TO LOAD XML TEMPLATE
INFORM LOADING OF XML TEMPLATE
INFORM LOADING OF XML TEMPLATE
PROVIDE ARGUMENT TO XML TEMPLATE
STORE IN QUEUE
REUQEST TRANSMISSION
REUQEST TRANSMISSION
REQUEST TRANSMISSION AFTER MATERIALIZATION
TRANSMIT TO DEVICE
RESULT OF TRANSSMISSION
RESULT OF TRANSSMISSION
REPEAT BY CONNECTION MANAGER 123
REPORT RESULT OF EXECUTION (WHEN ERROR OCCURRED, PEPORT DETAILS OF ERROR)